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Valuable Improvement in Gas-Making.

The greatest improvement in the economy of gas-making during the last quarter century, is doubtless the substitution of clay for iron retorts. A serious drawback, however, manifested itself, in the discovery that the deposit of carbon within the retorts (always a serious evil) was greater in clay than in iron retorts. It is not necessary to say anything to practical gas-makers in regard to the damaging effects of this deposit, or of the want of practical success of the many devices and contrivances to prevent it. Most, if not all of these have been predicated on the idea that the deposit could only be prevented by the reduction of the back pressure on the hydraulic main, and although the exhauster and some other inventions have, to some extent, met the requirement, practical difficulties in their use, and the imperfect results, have prevented any considerable reliance on them, or their general adoption. Happily however for gas makers, we are enabled to present to them a plan free from existing objections, and which accomplishes the desired object, by a process which is simple, cheap and certain; not liable to derangement or accident, and requiring no care or attention which cannot be rendered by any ordinary stoker. This plan will be easily understood from the following description and illustrations of "Alfred Odiorne's Seal for Hydraulic Mains for Gas Works," patented June 6th, 1871.

Fig. 1 represents a vertical section of the seal.

Fig 2 is a longitudinal vertical section of the same.

In the ordinary gas works the gas, in passing from the retorts to the hydraulic main, is intercepted by the hydraulic seal, and has to be forced through by accumulated and otherwise unnecessary pressure in the retort. The object of this new seal is to prevent the gas from flowing back to and out of the retorts while the same are open for drawing and charging. The new seal is therefore only necessary during this brief time, while by the process in common use the seal is continual. It consists of a box, A, for each bench, placed in the hydraulic main, B, with a compartment in the box, *d*, for each dip pipe, C. When the box rests on the bottom of the main, the top of the box is one inch below the ends of the dip-pipes, and when filled with water, or the products of condensation, it will not obstruct the gas, but let it flow freely from the retorts into the main. When the box is raised up, the ends of the pipes, C, are immersed, and a seal is thus made, preventing the flow of the gas back to the retorts. The box, A, is suspended by two round iron rods, *a a*, of which one projects from each end of the box to a lever, D. The rods pass through the top of the main, B, and are connected with the lever above said main, the lever being pivoted outside of the same. The holes through which these rods pass are larger than the rods, allowing them to rise and fall with ease, and are sealed from leakage by annular sealing cups, E, through which the rods pass. These cups are screwed or otherwise secured to the main, and are of sufficient depth to resist the outward pressure from the main, and are filled or partly filled with water, glycerine, or any other suitable liquid. A cup, E, is suspended from each end of the lever, D, and embracing the rod. *a*, enters with its open lower end the annular cup, E, and the liquid therein, producing an air tight seal. The outer end of the lever, D, is weighted, and is provided with a small chain, *b*, by which the stoker can easily raise and lower the box.

Fig. 1.

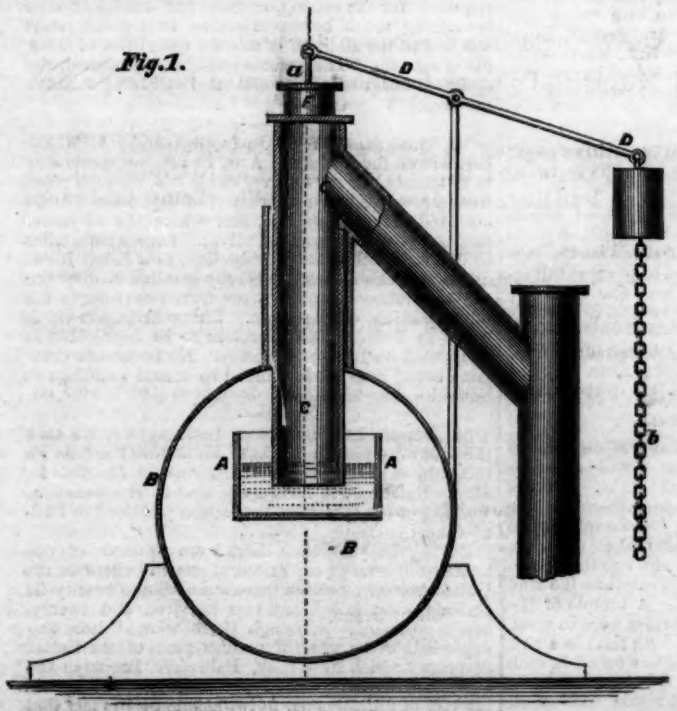
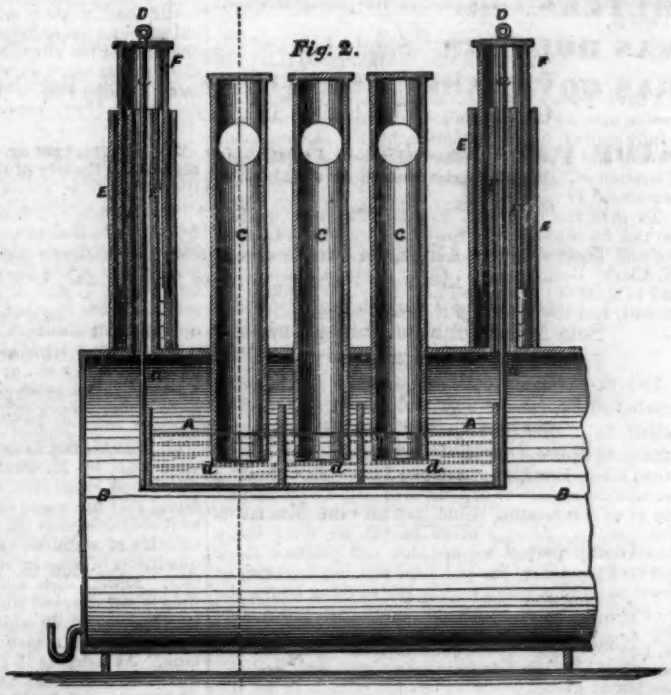


Fig. 2.



By this improvement the back pressure on the retorts is lessened from two to four inches, or about one half of the ordinary pressure. In a great measure the collection of carbon in the retorts will be prevented, as well as the clogging in the stand-pipes and leakage, while the yield of the gas is increased, labor and fuel saved, and wear and tear lessened. It also obviates the necessity of keeping any liquid in the hydraulic main, giving increased main capacity.

Before patenting this invention, the inventor determined to test it thoroughly, and with this view it was more than a year ago, put on all the benches of one of the hydraulic mains in the gas works in Springfield, Illinois, and it has been in constant operation up to the present time. One of these benches of retorts (threes) was let down on June 10th, 1871, on account of the decrease of consumption of gas. It had been worked steadily, day and night for 12 months, without

being charred or burnt out, or the use of any other means for removing carbon. It was examined when cool, and nothing was found on the inside of the retorts but a very thin scale of carbon, not half an inch thick on the average. With four minutes labor each retort was perfectly freed from carbon, it being soft and loose, and not adhering to the retorts. This bench will probably last a year longer, and it will doubtless continue free from any detrimental deposit of carbon. The other benches have done quite as well. These benches have been run at a very high heat during the year, and show a largely increased yield of gas over previous results. The present pressure on the mains is about five inches, while it was full eight inches before the seal was put on. These results would seem to indicate that the prevention of the accumulation of carbon in the retorts is not entirely owing to diminished pressure, but is occasioned in a great degree by the avoidance of the heavy *intermittent* action of the old hydraulic seal in the mains. If this view is correct, the "Odiorne Seal" must prove a valuable adjunct to exhausters in several evident respects, and by giving steadiness to to the action of thin pressure and vacuum gauges, will thereby lessen the supposed dangers from their use.

Several advantages of minor importance result from the use of the Odiorne Seal; the labor in keeping the stand pipes and mouth-pieces clean is lessened more than one half; there is much less leakage from the retorts; no danger of fire from leakage; a saving of fuel: and the charring out of the retorts, which was very injurious to them and laborious, is rendered unnecessary.

An invention which has practically accomplished all these above results, may reasonably be characterized as highly important to gas makers, and we confidently commend it to their consideration.

Further information on the subject will be promptly furnished, on application to ALFRED ODIORNE, Superintendent Gas Works, Springfield, Ill. A circular to gas companies will shortly be issued, and in the mean time all gas companies in good standing will, on application as above, be allowed to put up, and use this improvement for six months, without charge. The cost of the apparatus is trifling, and a very moderate consideration will be expected for the permanent right to use it.

OFFICE OF THE SPRINGFIELD (ILL.)
GAS-LIGHT CO., June 26, 1871.

I have been a constant and close observer of the twelve months trial of the seal mentioned above, and I fully concur in and endorse the statements made above; and I heartily commend the seal to the consideration of gas companies, as a most valuable improvement in gas making.

To give the due effect to this verificatian where I am not known, I refer for my standing to the Importers' and Traders' National Bank, New York; Joseph W. Clark, Boston; E. W. Clark & Co., Philadelphia, and to most of the bankers in Chicago, St. Louis, Cincinnati, and the West and North West generally.

N. H. RIDGELY, Pres't.

THE ECONOMY OF ICE-MACHINES.—In an elaborate article found in the *Bavarian Industrie und Gewerbeblatt*, 1870, Prof. C. Sinde attempts an exhaustive examination of the circumstances under which the so-called ice-machine, depending on extraction of heat by mechanical means, or expansion of either a permanent gas or an evaporating liquid, can give the most favorable results. Among other results, he finds that a theoretically perfect ice-machine can produce three hundred pounds of ice per hour per horse-power, or about one and one-half tons in ten working hours, the ice being at 25 deg. F. and produced from water of 50 deg. F. Using 3 lbs. of coal per hour per horse-power, one lb. of coal would be sufficient to produce 100 lbs. of ice; but, as the most perfect ice-machines show, one pound of coal produces but ten pounds of ice, the loss of effect being nine-tenths of the result theoretically possible. It would seem from this that the prospect of solving the problem of making ice by machinery, so that the cost of production of it may be reduced considerably below the present, is not very flattering, especially when we consider that a great part of the loss of effect is caused by circumstances which cannot be avoided.—*Technologist.*

TO IMITATE BLACK-WALNUT.—The appearance of walnut may be given to white woods, by painting or sponging them with a concentrated warm solution of permanganate of potassa. The effect is different on different kinds of timber, some becoming stained more rapidly, others requiring more time for the result. The permanganate is decomposed by the woody fibre; brown peroxide of manganese is precipitated, the excess being afterwards removed by washing them with water. The wood, when dry, may be varnished, and will be found to resemble very closely the naturally dark woods.—*Technologist.*

Chemical Repertory,

No. 56.—July 17, 1871.

EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

25. *Ericsson's Speculations on Solar Engines.*—After saying that "it is not proposed to apply solar engines in places where there is not steady sunshine," and describing the rainless regions of the earth coming under this head, he proceeds to say:

Computations of the solar energy wasted on the vast area thus specified would present an amount of dynamic force almost beyond conception. Let us, therefore merely estimate the mechanical force that would result from utilizing the solar rays on a strip of land, a single mile in width, along the rainless western coast of America; the southern coast of the Mediterranean before referred to; both sides of the alluvial plain of the Nile in Upper Egypt; both sides of the Euphrates and Tigris for a distance of 400 miles above the Persian Gulf; and, finally, a strip one mile wide along the rainless portions of the shores of the Red Sea, before pointed out. The aggregate length of these strips of land, selected on account of being accessible by water communication, far exceeds 8,000 miles. Adopting this length and width of one mile as a basis for computation, it will be seen that the assumed narrow belt of the sunburnt continents covers 223,000 millions of square feet. Dividing this by the area necessary to produce 1-horse power, we learn that 22,300,000 solar engines each of 100-horse power, could be kept in constant operation, nine hours a day, by utilizing only that heat which is now wasted on a very small fraction of the land extending along some of the water fronts of the sunburnt regions of the earth.

Due consideration cannot fail to convince us that the gradual exhaustion of the coal fields will inevitably cause great changes in regard to international relations, in favor of those countries which are in possession of continuous sun power. The time will come when Europe must stop her mills for the want of coal. Upper Egypt, then, with her never ceasing sun power, will invite the European manufacturer to remove his machinery and erect his mills on the firm ground along the sides of the alluvial plain of the Nile, where sufficient power can be obtained to enable him to run more spindles than a hundred Manchesters.—*Engineering.*

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26. VENTILATION OF SEWERS.—In reporting a paper read to the Society of Engineers by BALDWIN LATHAM, the *Lond. Jour. Gas-Lighting* says:

The complete exclusion of sewer gases and vapors from private houses would seem to be a hopeless problem. Place the most perfect contrivances for the purpose in one of our best houses, and so great is the ignorance, or so gross is the carelessness, that it may be safely said the apparatus would not remain in effective operation for a week.

Mr. LATHAM lends his support to the use of charcoal filters for sewer air, and has devised a form of filter which obviates most of the objections to those that have hitherto been employed.

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27. ZINC WATER TANKS.—The *Lyons Medical* contains an article, by M. ZINREK, who has examined water which had long been kept in such tanks. He has found that the water dissolves so much the more zinc as it contains more chlorides, such, for example, as the chloride of sodium. The water also takes up larger quantities of zinc in proportion to the length of contact. Boiling does not, however, precipitate the zinc from water charged with the metal. A sample of the latter was tried, in which the chlorides were in small proportion, but which had been a long time in a zinc tank. As much as 15 grains of zinc was found in each quart. To prevent this state of things, the author advises the zinc tanks to be coated inside with an oil paint, the basis of the paint being ochre or asphalte. No minium, ceruse, or carbonate of zinc should, however, be used. Fifteen grains in a quart seems an enormous proportion, nor does the author say whether he found the actual metal or a salt of oxide of zinc.

[On this subject of zinc in drinking water, we shall give, in next number, an important note from among the original articles in the *Amer. Chemist.* In another column we have a selected article containing much on the subject of zinc water pipes.]

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28. SULPHURIC ACID FROM PYRITES.—The consumption of pyrites for this purpose in Great Britain in 1869 was 395,896 tons, three-fourths of which quantity was imported from Portugal, Spain, Norway, Holland and elsewhere. Of this 265,453 tons were from copper pyrites, which contained 7,600 tons of copper.—*Am. Chemist.*

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29. HARDNESS OF WATER.—A. WAGNER (*Jour. fur Gasbeleuchtung*, Jan. 15) rejects soap-solution for determining this, and recommends to first weigh the total solid residue from the water, and then the portion of this insoluble in water. This gives us the amount of mineral matter in the water held in solution by carbonic acid, but we are at a loss to see how it can furnish any index to the hardness. The soap-solution *must* be the *practical* test for this.

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30. MCCRACKEN'S PROCESS.—In the same number of the *Jour. fur Gasbeleuchtung* as above, is translated *from us* an account of the apparatus of MCCRACKEN, for utilizing the tar in adding to the quantity and quality of the gas.

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31. PHOSPHATE OF LIME IN RUSSIA.—*Les Mondes* states that workmen excavating for drain-pipes near St. Petersburgh, found at about six feet below the surface a deposit of native phosphate similar to that of the Ashley and Cooper Rivers in South Carolina.

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33. PREPARATION OF NITRITES.—SCHOENBEIN found that sodium reduced a solution of an alkali-nitrate to nitrite. In a paper before the Royal Society lately, EDWARD DIVERS stated that by using sodium-amalgam, complete reduction of the nitrate could be accomplished, and that from the solution thus formed, after neutralization with an acid, nitrite of silver could be freely precipitated by adding nitrate of that metal. From the argentic nitrite of course all other nitrites are readily preparable.

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33. PRECIPITATION OF MUD FROM WATER BY SALINE SUBSTANCES.—About a year ago it was announced by DR. C. SCHLOESING that minute quantities of many salts, particularly of chloride of calcium, immediately precipitate from water sediments mechanically suspended, one thousandth part of the latter salt "acting in a moment." Mr. SKEY writes to the *Chemical News* (May 12, 1871) claiming that *he* made this same discovery and published it in that Journal April 3, 1868:

[The editor attaches great interest to this subject, being able to vouch, from personal experience for the practical value of those obscure and little known agencies. Having had occasion lately to pulverize and electriate a mineral in quite large quantity, he was much troubled by time (two or three days sometimes) required for the setting, of the fine mud, and after recovering much by actual boiling to dryness, resort was had to the addition of minute quantities of chloride of calcium. The success was almost magical, the sediment coagulating at once and subsiding in a few minutes.]

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34. ILLUMINATION.—A paper was read by A. M. SILBER, before the Society of Arts, in London, proposing to distribute mineral and vegetable oils, through pipes from a receiver in the upper part of the house. Lamps are fixed wherever desired, into which the oil flows, through properly regulated valves. Somewhat similar to this is a method of illumination, now being introduced into this country, whereby gasoline is distributed to burners through tubes from reservoirs in the upper portion of the room. Either arrangement is liable to leakage, and, therefore to be deprecated as dangerous to life and property. No Insurance Company could have the hardihood to insure buildings so lighted.—*Am. Chemist.*

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35. BOILER EXPLOSION AND INSPECTION.—We take the following paragraphs from an editorial article on this subject in the *Jour. of the Franklin Institute* for May. Reference is had in the first to the beneficial working of the system of Inspection practised in Philadelphia:

During the year 1870 there were upwards of one hundred disastrous explosions of steam boilers in the United States, by which three hundred and twenty-six persons were killed, and two hundred and twenty-seven wounded. Although there were at least two explosions every week in various parts of the United States, of which New York, Baltimore, Brooklyn and Chicago had their respective shares, none occurred in the city of Philadelphia, notwithstanding the fact that it has a greater number of boilers than any other of the above mentioned cities.

Boiler insurance and inspection companies—and they are no new or experimental thing—simply prove that boilers constructed and maintained according to well known rules, are practically safe; that the chances of explosion, even with ordinary water-tending, are very remote, and they stake their money on this knowledge; and yet the United States Government has been unable to check the increase of these disasters. If Congress cannot at once provide for the security of the public against boiler explosions, it had better let out the job of protecting its citizens to some insurance company, and then it will be done on scientific principles, and by competent men."

The fastest railroad train in the world, probably, is said to be a new express on the Exeter and Great Western Railways, from Plymouth to London, the journey one hundred and ninety-four miles being arranged to occupy four hours and a quarter.

Pipes for Domestic Water Service.

There is nothing about which we receive more numerous inquiries than water pipes. Most people are getting suspicious of lead for this purpose, it having been shown that this metal often contaminates the potable waters conveyed through pipes made of it. For a time, quite a popular impression prevailed that in zinced, or, as commonly called, galvanized iron pipes, the cheap and safe water conduit for domestic purposes has been found. This is still maintained by some, and it is with a view to throw additional light upon the subject that the present article is written.

There is no doubt, as we have shown in previous articles, that iron pipes, thoroughly coated with zinc, and conveying perfectly pure water, will not contaminate the water to any appreciable or hurtful degree. Waters containing acids or free alkalies will, however, speedily become charged with the oxide or salts of zinc, to a greater or less extent, depending upon the character of the water. In some cases, where there does not appear to be a notable amount of alkalies, acids, or salts, the solutions of which dissolve or combine with zinc oxide, there is still rapid attack upon the metal. We have a specimen of such a pipe that is nearly filled with a deposit of metallic origin, resembling mixed metallic zinc and red oxide of iron. An analysis of this deposit would be interesting. Pure water acts more powerfully upon lead than upon zinc. While the oxide of lead is readily soluble in water free from carbonic acid, it is converted into a comparatively insoluble, or difficultly soluble, carbonate, whenever it is exposed to water containing carbonic acid. In experiments made by the government commissions appointed to examine into the chemical quality of the water supply of London, the extraordinary effect produced by a small quantity of carbonic acid in the way described was most particularly noted. Pure distilled water placed in contact with lead became highly poisonous, while that containing three per cent of its volume of carbonic acid remained safe. They decided that sufficient carbonic acid is usually found in well, river, and spring waters, to render lead pipes a safe means for conducting them.

Notwithstanding this, they admit that, from causes little understood, water will at times act with unusual energy upon lead; and we have no doubt that imperfectly understood conditions will often render it powerfully energetic in its action upon zinc coated iron pipes. The specimen of the kind of pipe, above referred to, which has almost become stopped by its deposit of mixed oxide, metallic granules, and salts, would seem to indicate this, as the water which flowed through it has always been regarded as being of ordinary purity for drinking and culinary purposes.

A prominent leader in the Shaker family at New Lebanon, N. Y., assures us that they have not succeeded in the use of zinc coated pipes; and regarding lead with disfavor, they are meditating a return to the old pump log service, once so much used in this country.

We are cognizant of another example, in a town near Boston, Mass., where a new house was piped with galvanized iron pipes. Sickness soon overtook the family, one of its young members died, and a *post mortem* examination revealed the presence of salts of zinc in the stomach and other organs. Death was directly attributed to the use of these pipes.

Mr. Robert Rawlinson testified, before the commission referred to, that galvanizing iron pipes is a delusion. He said: "If the pipes are laid in subsoils which will act upon iron, the galvanizing affords no protection against that action, and there are soils which will rapidly eat away either iron or lead. If you examine a galvanized iron pipe under a microscope, you will find that it is not an even coating; it is freckled. and there are interstices, oxidation sets up, and then the galvanizing is blistered off; it does not improve, and, even so far as it does cover it, I doubt very much whether it preserves it; it is not stronger in its texture, and it certainly does not last longer; that is my experience."

Mr. Thomas Duncan, engineer of the Liverpool Water Works, stated that "the effect of soft water upon iron pipes was to produce an infinite number of small tubercles; these have grown up, and they project, in many instances, for about three quarters of an inch, reducing the diameter of the pipe between point and point, one and a half inches, thereby increasing the friction. They form an infinite number of little eddies, and it is not only the space they occupy in the pipe, but, from my observation, I believe the effects extend much further into the interior of the pipe, and disturb the current."

A method has been recently patented for coating pipes internally by silver electroplating therein. Water containing sulphur would, of course, in time convert such a coating into the sulphide of silver; but this, being insoluble in water, would protect the pipes as well as the metallic silver. Should the water contain any alkaline hyposulphites, and also free chloride, the silver may be gradually converted into a chloride, which, being dissolved by ammonia, would, after a time, result in the denudation of the lead. Of course, the time required for this action, if it should take place, can only be determined by experiment; but in such waters as contain traces of the substances named, such action would seem likely to result ultimately. It is known that silver exposed to an atmosphere containing chlorine will gradually blacken from the formation of chloride; and it is probable that this would occur, to some extent, in water pipes coated with silver. The cost of the metal will stand in the way of using a very thick coating; and, therefore, any chemical action will be more apt to interfere with the economical application of silver to this purpose.

In Boston the lined copper pipes are coming into vogue, and are pronounced perfectly safe in all respects. The copper is tinned before being made into tubes, and the interior of the pipe is again tinned when made up. The expense of these pipes is about the same as lead pipes of equal strength.—*Scientific American.*

British Association of Gas Managers.

At the Eighth Annual Meeting held in the Theatre of the Royal Dublin Society, Tuesday, June 13, the Inaugural Address was delivered by Edward White, Esq., of Birmingham, Vice-President, in the absence of the President, Mr. Livesey. We reprint it nearly in full (as it is replete with interesting and instructive matter), omitting only some brief passages, of but local interest.

The papers already announced for this meeting, so far, at all events, as I may judge of them from their titles, and from what I know of the abilities of the several authors, are fully up to the standard of those read at previous meetings. The subjects are eminently practical, and therefore of universal interest. Mr. Paterson's paper will, I presume, be a continuation of the valuable communication he made to the association three years ago. in which, it will be remembered, he gave us not only an excellent description of the various kinds of cannel, but also a valuable account of the quantity and quality of gas obtained from each sort.

The subject that Mr. Warner proposes to introduce to the meeting is also of great practical interest. As to the best form of condenser gas engineers are not as one in the matter, and if Mr. Warner will furnish us with results which will assist us in deciding which form is best to employ, I am sure we shall all be thankful to him.

The new equilibrium gas-governor, which has been invented and will be described by Mr. Charles Hunt, will, I hope, be proved to be a valuable invention. Of the economy of employing exhausters no engineer, I think, can have a doubt; and Mr. Anderson, than whom no one is better able to treat of this matter, will, I expect, furnish us with some valuable practical information. His remarks will, I understand, be illustrated by exhausters in actual operation at the Alliance Gas Works, which you will be invited to view.

Much, I believe, would be gained if the small gas works scattered about in agricultural districts, could at once make up their ammoniacal liquor into a marketable commodity, which is always in demand in their districts. The works in those localities are always small, and their residual products are nearly always wasted. Mr. Eldridge will, therefore, render not only the gas companies, but the community at large the greatest service, when he shows us how sulphate of ammonia can be made with ease and profit at small gas works.

The subject of the communication which Mr. Somerville will make to us is also one of great practical interest. There are few managers, I imagine, who have not been annoyed by choked ascension pipes, and Mr. Somerville will deserve the thanks of most gas engineers when he has taught us how these obstructions may be readily and effectually prevented. Nothing is of greater importance to the successful management of gas undertakings than an exact knowledge of the cost of the production and distribution of our gas. Every gas manager has, no doubt, his own way of arriving at these details, all I dare say accurate enough. Still much trouble will probably be saved in many cases by the use of printed forms, such as will be laid before you by Mr. Warner and Mr. Niven in the descriptions of their carbonizing accounts.

There are two papers set down for reading, which are of great interest to others besides gas managers. I allude to those relating to the spontaneous combustion of coal. On this matter we may perhaps learn something from the experience gained in this city. I will not anticipate anything the authors of these communications may have to say, further than to express a hope that we may receive from them such explanations of the causes of these accidents as may teach those who are liable to them how to prevent them in the future, not only in the stores of gas works, but in other places, such as the holds of steamships, where similar occurrences have more than once led to an awful loss of life.

A paper is promised by Mr. F. W. Hartley, "On Gas Measurement," and I need not dwell on the importance of this subject to all gas manufacturers. I know it is said our means of measuring gas, whether as manufactured or sold, are not satisfactory. For my own part, although aware the instruments in use are not perfection, I believe, where proper care is taken in selecting the meters made by the best manufacturers, and avoiding such as are commonly called cheap, together with due inspection, comparatively few complaints will be received of imperfect or unfair registration. In this view I am fully borne out by my experience in connection with the company I represent, for there have been but very few complaints, and whenever a dispute has arisen between a consumer and the company, necessitating a reference to the official tester, the meter has been found to be invariably correct. Still in this, as in all matters of commerce, it is very desirable that the most perfect instrument should be adopted, and from the great experience of Mr. Hartley, and his acknowledged mechanical skill, I am induced to hope that we shall gain some valuable information from him.

Lastly, I come to the titles of two papers devoted to the utilization of tar. It is too early, perhaps, even to dream of the day when coal will he converted into gas with little or no production of tar, but it occurs to me that this is within the region of possibility, and will be accomplished. In the meantime I cannot help thinking that the best application of tar as we find it is to convert it if possible into gas, and for that reason I rejoice that this subject is to be introduced for discussion by Mr. Arnott. Some experience on this matter, I believe I am right in stating, has been gained in this city; and we may hope to hear from Mr. Somerville of his results with one particular process, in which tar is incorporated with coal before it is introduced to the retort. Further than this I shall not anticipate anything Mr. Arnott may have to say on the subject.

As regards tar pavement, respecting which Mr. Anderson is to give us some additional experience, I may remark that objection has been taken to the plan as described to us by Mr. Methven last year, as involving great waste of valuable material in the boiling down of the tar as a necessary preliminary to its being mixed with the shingle or ashes, and which might be saved by previous distillation of the tar. This, doubtless, would apply to large works with the facilities for disposing of the tar to the distiller, and where a fair price is obtained for it, but in very many of the smaller works, where it is impossible to get rid of the tar at any reasonable price, I think Mr. Methven's simple and effective way of converting it into tar pavement well deserving the consideration of managers of small works. Without anticipating further what may be said on the subject, I will just say there is one way I consider would be very appropriate and, I think, successful—that is, to imitate as nearly as possible the material found in the Val de Travers, and which has been laid down in the city of London with so much success. This, as you are aware, is a limestone rock, which is permeated with from 15 to 20 per cent. of bituminous matter. It cannot, I hope, be beyond the reach of our mechanical skill to incorporate the pitch resulting from the distillation of tar with earthy materials to form a compound which may rival the natural compound in the ease with which it may be laid, and the stability with which it will endure. Failing the conversion of tar into gas, which I hope to see, I feel inclined strongly to protest against throwing away irrecoverably such valuable ingredients in the tar as the benzole, from which we derive such a valuable disinfectant.

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I may here make a few remarks on special gas legislation as evidenced in the private Acts passed last year and those which are before Parliament this year. We see in these what I believe to be a thoughtless and unreasonable disposition to raise the illuminating power of the gas, while reducing the maximum price at which it must be sold. I say thoughtless, because our northern neighbors who insist upon 25 or 30 candle gas can hardly have taken into consideration the inevitable consequences of their acts. Whatever may be thought about the duration of our deposits of coal in general, there can be no doubt that our beds of cannel are very limited in extent, and that they are being rapidly exhausted. Guided by the prices alone, I find that an average rise of about 25 per cent. in the price of cannel coals has taken place in 20 years. This exceeds Mr. Jevon's estimate that the price of coal is doubled in a century. I cannot think that this steady and continuous rise of price in our raw material is sufficiently considered, either by the parties who propose or the Legislature which restricts us to a limit of price in perpetuity. In common gas coals a rise of price in

accordance with Mr. Jevon's estimate has taken place, and we may be certain that in the course of no distant time, without some great discovery of which we have at present no suspicion, the manufacture of gas of high illuminating power from British coal will be impossible. Under these circumstances, I would point out the advisability of restricting ourselves to reasonable limits. In my opinion 14-candle gas, properly burned, is good enough for all purposes and for any place. Although, in my own case, I am compelled to supply gas of a superior illuminating power, I consider 14 candles to be ample; while in Paris—certainly, in its happy days, the best lighted city in the world—the gas was even of a lower quality. There would be one advantage in having gas of the same quality all over the kingdom, to which I shall make further allusion presently—namely, that the same burners would be applicable everywhere. But what I wish to insist on now is the necessity for economizing the consumption of cannel coals. This point was briefly referred to by one of our past presidents, whose opinion is particularly worthy of respect—I mean Mr. Hawksley—and was mentioned by Mr. Barlow, the other day, in his evidence on the Aberdeen Gas Bills. In spite of warnings like these, however, our municipal bodies continue to demand, and the Legislature continues to impose on us the obligation to supply gas of high illuminating power, when it seems more than probable that, in the course of a very few years, we shall find ourselves without the material to furnish it A consideration of this kind gives great importance to a subject which I have said will be brought before you—the manufacture of gas from coal tar.

You will, doubtless, have observed the tendency in these days towards the absorption of gas undertakings by municipat authorities. To us, simply as gas managers, the matter is of no great importance; but since no one knows better than we do how often the undertakings in which people invest their savings remain unproductive for many years, I think we are bound, in the interest of our employers, to protest strongly against such a law as would allow a local board to buy up a gas undertaking at a disadvantage as soon as it was sufficiently profitable to invite cupidity. The danger of the enactment of such a law has, for the moment, passed away, but it may any year recur; and we may place our protest on record for use when occasion requires.

Closely connected with legislation you will see is the vexed question of standard burners. Of these, as you know, we have a variety. I have before suggested that it would be highly desirable to have gas of as nearly as possible one uniform quality supplied all over the kingdom. Then we might hear no more of a Birmingham burner, a Dublin burner, or a London burner. But, in any case, I think we may admit, without hesitation, that a test-burner should be one capable of receiving general application by consumers; if not, I believe we set up a false and improper standard, of which the general public have a right to complain. We have an undoubted right to the use of the most perfect instruments; but at the same time they should be instruments which can be employed by our customers. Having said this, I may say a few words on the burners the public can and do employ.

There is an old proverb which says that heaven sends meat, but that cooks come from quite an opposite quarter. It is not for us to say where gas-makers come from, and I will make no insinuation as to the origin of some burner-makers; but this I may say, that however good the gas we make, we find its value very commonly depreciated to the extent of 50 per cent. by the burners employed in consuming it. Now this is a very important matter, and deserves the serious attention of gas managers. Unfortunately, the greatest ignorance of the matter prevails among the public; and it would seem that gas fitters are no better informed. To them a burner is a burner; and as they obtain it from the maker so they fit it up, without any thought or any examination. The experiments of our fellow-member, Mr. Kirkham, with the most commonly employed form of burner—the fishtail—show some remarkable differences with burners, professedly similar, bought indiscriminately. I shall take but one illustration, No. 4, iron burners, premising that the gas employed was the same in all the experiments:

Experiment.	Fishtail Burner.	Illuminating Power in Standard Candles.
1	No. 4	11·11
2	"	9·36
3	"	6·43

I may quote also from the London gas referees report for 1869 the assertion that three fishtail burners, bought at random, were found respectively to give but 27, 24, and 23 per cent. of light when compared with the London standard burner; and such burners, I fear, are but too commonly found. These experiments exhibit the causes of the complaints we so often have, that consumers get but little light, when we know we are supplying gas of good quality. The matter of burners is, I think, one which gas companies and managers may often advise their customers with reciprocal advantage.

Here I may call your attention for a moment to some remarkable papers which have been published by Mr. Pole, the last appointed London gas referee, "On the Theory of Gas Burners," and also to the discussion on what is called Farmer's theorem.

The discovery, if we may call it so, has, you may remember, been claimed by another experimenter in America, but I believe it will always continue to be known as Farmer's theorem. The proposition laid down by Mr. Farmer, and supported by Prof. Silliman, is that the illuminating power of a gas flame (within certain limits of combustion) varies as the square of the quantity of gas consumed. The truth of this proposition, I may say, was not well sustained by the recorded experiments of Prof. Silliman and of Mr. Farmer himself, and it has been conclusively demonstrated to be inaccurate by the experiments of our colleague, Mr. Charles Hunt. Now, although the theorem of Mr. Farmer has been shown to be untrue, the fact remains that the law of simple proportion, by which we always calculate our illuminating power, holds good only within certain limits. In a rough sort of way we have always known pretty well what these limits were, and have also known that they vary with every kind of burner. We have all been aware, for example, that the maximum amount of light was obtained when the flame was on the verge of smoking, and that small variations of consumption below this point made but little difference in the amount of light, in proportion to the quantity of gas consumed. In what I may call the luminous papers of Mr. Pole, a scientific expression has been given to this well-known fact. By a process of reasoning which could only occur to a highly trained mathematical mind, Mr. Pole has arrived at the conclusion "that during the normal state of action of a gas burner the light given varies directly as the consumption, *minus* a constant quantity." The principle involved in this law, as laid down by the author, is unquestionably sound. "When the quantity of gas supplied to a burner is very small compared to its normal capacity, it is burnt to a disadvantage, having an excess of air; it is, in fact, in the position of a Bunsen burner, Hence, as has been often explained, the deposition of the light-giving particles is impeded, the flame burns blue, and the light developed is smaller than is fairly due to the gas employed. But as more and more gas is admitted this defect tends gradually to remedy itself, until a point arrives, where a normal and proper condition is reached, and beyond that point every increment of gas gives a corresponding and uniform increment of light." There is, of course, a point beyond which gas is consumed to no useful purpose; but this is equally excluded from what is properly termed the "normal range of a burner."

I may just mention here that the theory which Mr. Pole, and I may add nearly everybody else, assumes to be true—namely that the luminosity of a gas flame depends upon solid particles detained for an instant in a state of incandescence—is questioned by Dr. Frankland and others.

It would lead me too far from my present object to go into this question, but I may just mention that the experiments of Dr. Frankland have shown that the flame of hydrogen gas, which we all know is barely visible when burning under ordinary atmospheric conditions, becomes much more luminous when that gas is burned under great atmospheric pressure. This observation will not be forgotton, and in a coming age, when all our coal is exhausted, the "coming race," with perfected mechanical contrivances, may possibly illuminate the earth by means of pure hydrogen. In the meantime, nothing is more certain to us than that the luminiferous power of gas depends, first, on its chemical quality—that is, on the amount of carbon it contains; next, upon the heat of the flame, which depends upon the pressure at which the gas is delivered for combustion. In this statement, I think, we have the theory of gas burners complete.

To return for a moment to Mr. Pole, I think you will admit with me that he has given ample proof of the conformability of his new law with the most reliable published observations, and you will join with me in the hope that we may soon have a fuller and clearer illustration of it from original experiments.

I pass now to a brief notice of some novelties in manufacture and apparatus which have been lately introduced. The first I may refer to is one to which public attention has recently been called, but which, so far as I know, has not attracted much notice from gas engineers, nor has yet received any considerable application. I allude to the so-called improvements in the manufacture and purification of gas by Dr. Eveleigh. These I find described in the specification of a patent taken out in the early part of 1869. Some further improvements have since been patented, but the specification of these is not yet accessible. The improvements so far as they relate to the manufacture and purification of gas only, according to the specification of 1869, may be described in a very few words. Gas is first made in an ordinary retort, and is then passed through a series of what is called redistillation retorts. These are vessels set vertically in a furnace; they are packed the greater part of their height with charcoal and lime in small lumps, and at the top is placed a layer, one or two inches thick, of iron filings or turnings. The first of the series is connected with a reservoir of creosote oil, or petroleum, and (proceeding according to the specification) when the flow of gas from the retorts slackens, the liquid substance contained in the tanks is gradually admitted to the redistillation retort, now sufficiently heated, with a result apparent enough. How far this is anything more than a carburation process on a large scale it is impossible for me to say. It may be that if the retorts are sufficiently hot, and the vapor formed is detained for a short time under pressure, some decomposition of the vapors may take place. But from all we know of the changes which happen under such circumstances, and unfortunately they have been but little studied (Berthelot, a French chemist, has exposed naphthaline and other hydrocarbons to high temperatures and great pressures with the result stated, and Mr. Young, Jun., of Bathgate, has distilled heavy oils under pressure to obtain lighter), we may suppose that only other liquid hydrocarbons are produced which may be expected to condense when the gas has cooled, or before it has travelled any great distance. The process, it occurs to me, has a certain resemblance to the inventions of Messrs. Symes and Barff, and the Rev. Mr. Bowditch, for carburetting with the heavy oils of tar. Possibly Dr. Letheby, who has recently examined the gas, may be able to give us some account of its composition. An analysis of the gas or vapor produced in the process seems to me necessary before any attempt should be made to work it on a large scale.

Many, I dare say, will have some acquaintance with the process patented a few years ago by Mr. Basford, who pressed raw gas—or rather the gas as it issued from the retort—through a second retort filled with coke or charcoal. The object in this case was to break up the tarry matter into permanent gases; but the result, I believe, was not altogether satisfactory. A large amount of naphthaline was produced, and the gas rapidly lost illuminating power as it travelled. It ought to be remembered, however, that Mr. Basford used the poorest Derbyshire coal, and the results were highly satisfactory when the gas was distributed over a limited area. No process of this kind that I have yet met with appears to me workable on any extensive scale.

I do not think it necessary further to criticize this process, for, now being brought prominently before the public, its merits will no doubt be thoroughly sifted by abler hands than mine.

No other novelty in manufacture occurs to my mind at the present moment, and I pass to what I have called improvements in apparatus. One of these, which I think will have attracted the notice of every gas engineer, is the direct-action method of exhausting, forcing, and washing gas by steam, invented by Mr. Cleland, of Liverpool. I have great hopes that the inventor will be here to describe his system at length, but, if not, I would recommend to every one present the attentive perusal of a description in a recent number of the *Journal of Gas-Lighting*, and also in *Engineering*.

It will there be seen that, by availing himself of the well-known action of a jet of air or vapor—which has received so many careful applications within the last few years—the inventor first of all relieves the retorts of pressure, forces the gas along its prescribed course, and, by the intimate commingling of aqueous vapor with the gas, effects, when condensation takes place, a more thorough washing than can be accomplished even by a spray scrubber. The advantages of this system appear to me obvious. In the first place, we may dispense with a steam-engine and other apparatus, expensive, and requiring much attention. Then, due regard being paid to the pressure of the steam, it appears to me that the action must be much more uniform and steady than that of the best exhausting apparatus we have at present at command. The use of the steam-jet necessarily involves some novelty in the form and extent of the condensing apparatus, which the inventor seems to have been successful in devising. Altogether I am disposed to regard this system with the greatest favor. If a quantity of steam used in the form of jets will do the same amount of work it can perform by setting machinery in action, we have the obvious advantage of getting rid of the machinery and its concomitant trouble and expense, with the additional good of an effectual washing. Before the meeting closes I do hope we shall have a discussion on the merits of this invention, which appears to me eminently to deserve the notice of gas managers.

There is one other recent improvement which calls especially for notice here, and that is the invention of Mr. Somerville relating to pipes and joints. Leakage from defective pipe-joints is, unfortunately, a thing with which we have all too much acquaintance, and few could confer greater benefit on gas companies than he who taught us how to make a sound and durable joint. Mr. Somerville is confident he has succeeded in making such a joint, and no doubt you will have the opportunity of inspecting some specimens. All I need say of the invention is that it well deserves your notice. The collar joint, which Mr. Somerville

prefers, is easily made, and, as he tells us, allowed of no escape at a pressure of 95 lbs. to the inch. The saving consequent on such a complete prevention of leakage would amply compensate for some extra cost in the pipe, which, however, appears to be a very trifling amount.

In connexion with the purification of gas, I am not acquainted with any novelty which requires a lengthy notice. So far have we got in purification, that at the present time the term impurity may be restricted to a single substance—sulphur. The complete removal of this obnoxious ingredient—that is by practicable means—for the moment baffles us, but I have great confidence that in a few years it will be accomplished. In the meantime we all know that it is possible to keep the amount of this impurity within reasonable limits. At our last meeting, you will remember, we were startled by the information that our common system of purification added to the amount of sulphur in forms other than that of sulphuretted hydrogen

The results subsequently published in the report of the London gas referees do indeed go to show that in our purifying apparatus sulphuretted hydrogen is decomposed, and the sulphur combined with carbon to form bisulphide of carbon, or possibly united with some hydrocarbon; but, at all events, into some compound which is not removed by either oxide or lime. This statement remains at present uncontradicted, and I may add unsupported, and we must wait for the next report of the referees to see whether or not further careful researches have established its truth. True or not, however, the duty of a gas manager is clear; and, without entering upon the vexed controversy whether the quantity of sulphur commonly found in gas is or is not injurious, I think we shall all do well to strive towards the manufacture of that ideal gas, as some may call it, which should consist of light-giving hydrocarbons alone.

I have learnt with some regret that the process of purification, in part the invention of Mr. F. C. Hills, which was described to us at our last meeting by Mr. Upward, has not been found to realize the hopes that were formed of it. It certainly had the appearance of an eminently practical plan, and possibly something may yet be done to make it effective. Among other plans which have been proposed for the removal of sulphur compounds from gas, I find one the invention of Mr. A. G. Vernon Harcourt, of the University of Oxford. The first part of this process, like that of the Rev. Mr. Bowditch, consists in the conversion of bisulphide of carbon into sulphuretted hydrogen, which Mr. Harcourt accomplishes by causing the gas to pass through a mass of iron turnings or wire stuffed into the mouth of a retort after charging, and there, of course, heating to dull redness. This part of the process is no doubt effective, but difficult to apply when some hundreds of mouthpieces are engaged. The second part of the process, which is designed to remove the sulphuretted hydrogen, consists in the use of oxide of iron, suspended in water in a vessel similar to a wet-lime purifier. With this is combined a plan for the continuous purification of the oxide by bringing the liquid into contact with atmospheric air, and a further process for the production of some persulphate of iron, which, meeting with ammonia in the gas, fixes it as sulphate of ammonia, while fresh oxide of iron is precipitated to decompose the sulphuretted hydrogen. This latter part of the process is ingenious, but it may be doubted whether the whole system is applicable on any extended scale. It has been tried, I believe, to some extent at the Oxford Gas Works, but with what result I do not know.

As it is of great importance to us to know how much sulphur is actually present in our gas, I may here refer to two processes for its estimation which have been published since our last meeting. They are to be found in the number of the *Journal of Gas-Lighting* for October 11, 1870. One is a method devised by Mr. Harcourt, whose process of purification I have just noticed. This is, no doubt, a very accurate method, but it has the disadvantage to us that it requires an expensive system of apparatus, and some attention in its execution. I do not think I need describe it to you. Mr. Marriott's is a somewhat simpler plan, and I fancy just as accurate. Like Mr. Harcourt's, however, it involves the employment of an aspirator to draw the products of the combustion of the gas through the so lution of permanganate of potash employed to fix the sulphur in the form of sulphuric acid. Neither one of these plans, it seems to me, offers such advantages over the simpler methods of Dr. Letheby and the London referees, as to make it worth our while as managers to adopt it. In neither case have we any assurance that we have secured the whole of the sulphur in the gas, and, while waiting for the day when some ingenious chemist shall give us a simple method of ascertaining with certainty the entire amount of sulphur, I think we may content ourselves with employing the readiest means we possess of arriving at an appropriate result.

The number of new inventions I have brought to your notice is very few, but, if you look at the records of patents granted, you will see that inventors are more numerous. It is the misfortune of most of these gentlemen that they are unable to bring their inventions into public notice. Many of them may be trivial, some of them perhaps positively dishonest patents, but that is no argument against the propriety of a patent law. The advisability of such a law is now under discussion, and, speaking as I do to-day in the presence of many whose originality and experience have contributed to the perfection in the manufacture and distribution of gas at which we have now arrived, I feel bound to maintain the justice and policy of an efficient patent law.

Nothing can be sounder in principle than our present law, which is intended to reward an inventor by giving him a monopoly of his invention for a limited time. We know, however, as a fact that the original inventor is seldom rewarded, and that plagiarists and adapters often reap the profit due to originality. This may be an argument for a fuller preliminary investigation before a patent is granted, but is none against the principle of a patent itself. It is curious to observe that the opposition to the existence of any patent law comes mainly from two classes of men; some who have profited largely by patents, and some who have had to pay for the use of patented inventions. The conduct of the one class is not to be wondered at; of the other I will not speak. There are, besides, a few who profess to believe that inventors would be better rewarded in the absence of any patent law. They are, perhaps, of opinion also that property would be safer in the absence of bolts, locks, and policemen. They are welcome to their opinion; but we, who are practical men, with an existence to maintain in a world of fierce competition, may be excused for requiring guarantees against the selfish appropriation of the work of our brains and hands; and I think we may fairly join in a movement for the amendment, if you please, but emphatically against the abolition of our law of patents.

Those of you who had the pleasure of seeing the magnificent works at Beckton last year, and enjoying the hospitality of the chief engineer, Mr. F. J. Evans, will have heard with regret of the accident which destroyed one of the gasholders, which excited so much our wonder at the size, and admiration for the skill displayed in the construction. The immediate cause of the accident, which has had its counterparts in several other cases, was a high wind acting upon a gasholder which I have no doubt, under the circumstances, was too full. Whether the construction or the materials were or were not faulty, is a matter under discussion, and I dare not allude to it. But this I may say emphatically; if you have gasholders in exposed situations, do not fill them too full in windy weather.

I am approaching the conclusion of a task which I am conscious of having imperfectly performed. I console myself, however, with the reflection that, after all, the Inaugural Address is perhaps the least important part of our proceedings; our real business commences when we begin to share our knowledge, experience, and opinions with each other, by the reading of papers and the discussions which succeed. In this last mentioned part of our business, I hope the members will exhibit no timidity. Every speaker who gives us his experience lends most valuable aid, and he who simply asks a question often elicits most useful information.

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Eds.

The New Dry Scrubber of St. John and Rockwell.

New York Gas Works, July 11, 1871.

Messrs. Editors: The question of the treatment of gas by friction, instead of temperature, or the use of water, seems to be agitated somewhat of late, and having read some comments upon the same, would respectfully solicit a portion of your valuable columns for a few ideas which have been practically developed in my experience.

The manufacture of gas, no doubt, is susceptible of some improvement, as well as the manufacturing of any other article; but there seems, unfortunately, too much prejudice existing against the introduction of improvements in this particular branch of industry. There have been many humbugs, or silly attachments to the general apparatus, in use at the various gas works in this country, as well as in Europe, but the scrubber of St. John and Rockwell, a description of which appeared in your Journal, is the result of 18 years experience at the New York Gas Works, at 21st Street and Avenue A, where I have been employed.

Great care has been taken in constructing this machine to work thoroughly. In gas-making there are so many positions in which you are placed, many of which are conducive to anything else but comfort. You are like a single fortress that may be bombarded from every point of the circle, shell after shell exploding in close proximity, coming from all quarters, and soon your small band is forced to surrender. This scrubber of ours, to meet such assaults, has been constructed upon the most modern principles, and its casemates so completely guarded, that it furnishes shelter and guarantees safe delivery of any volume of gas that may be manufactured.

There are some doubts expressed upon its merits as a condenser, by a correspondent who signs himself "Out West," published in your Journal of June 2d, but its scrubbing properties he acknowledges. This is very good; but my belief is, and my experience has proved, that the vapors should be condensed, neither should the tar be brought down to low temperature, in order to precipitate or to arrest it. My experience agrees with the ideas expressed by "Investigator," in the same number of your Journal, where he says plainly, that it is not a question of temperature, but of friction, and that this is what is requisite to arrest all tar existing in the gas, after leaving the hydraulic main.

My experience proves this conclusively, and having had much to do with this particular branch, I am fully convinced of the fact. I would ask, why it is that the bulk of the tar that comes from the coal is thrown down in the hydraulic main, if it is not friction? It surely cannot be temperature at this point, for there is very little difference in the degree of heat at the point where the dip-pipe is sealed, and the stand-pipe which is fastened upon the mouth-piece of the retort; yet we find that the bulk of tar is found there. But the seal is not all-powerful, and there is tar which is swept on by the torrent of gas beyond this point, as all gas manufacturers must have reason to know. Then, if there is such a large proportion of the tar arrested at this point, it is simply because it is in its warmest condition, and yields or obeys Nature's law when it is warm, and not chilled, which makes it stubborn and sometimes bids defiance to water or anything else, but the most rigid scrubbing. As I said before, this I know from 18 years experience. There may be some difference of opinion relative to this action. Some believe it highly necessary for the gas to be properly cooled before arriving at the purifiers; *agreed*. I would say to these, that if the tar existing in the volume of gas, after leaving the hydraulic main, is in its passage through the scrubbers all arrested, the gas or vapor must certainly be cool, for it is the tar in combination with the vapor that retains the heat; for the gas proper is quite cool, immediately after leaving the retort; and some part of the time is quite cool enough not to burn, or give much unpleasantness, when in contact with the hand. I have tried this to my entire satisfaction.

I am of the opinion, and remain to be unconvinced, that water ever was of any advantage, except so far as friction is concerned: for you may flood it with torrents, and the result will be from eight to ten candle power; while even when the water is very cool, there will be tar left in combination.

This scrubber has a very wide margin for any emergency that may arise. Its capacity for any volume of gas is of much importance; for instance, the main pipe being 20 inches in diameter, which gives an area of about 300 inches. Then the scrubber is constructed as the square is to the circle, which gives 25 per cent. more area, and whatever volume or quantity of gas is delivered by the inlet main, is easily received and delivered to the main connected with the outlet; the amount of friction requisite being effected by the lattice work, in case the corrugated plates and covers do not completely arrest all the tar. The hydraulic seal is of the utmost importance, as the gas is in all of its parts subjected to a large amount of friction; there is no possible escape for the slightest portion; also the tar being warmer at this point than it is upon reaching the upright pipes, the result is that a large quantity is thrown down here, as in the hydraulic main, without abstracting the rich qualities of the gas. This accounts for the increased quantity or percentage claimed for this scrubber. I do not wish to be understood to say that this scrubber makes more gas, but I do not forget the first lesson in mathematics taught me by my school madam: If John had four apples, and I took one of them from John, how many would he have left; three of course. Now I do say that this scrubber does not take the apple from John, but leaves it with him, and in the course of events it finds its way to his pocket. This is what is proposed for this scrubber, and gas manufacturers will surely realize the truth of the above problem in all its parts, by pocketing the emoluments, which otherwise are virtually stolen from them, and carried away by the sewers, etc., to parts unknown.

Great care has also been exercised in its construction, to guard against any emergency that can possibly arise, such as stoppages, etc., which would produce a blow out of the seals, which is not an unfrequent occurrence in any gas manufactory. 1st. the hydraulic seal can be dispensed with in a moment; also the lat-

tice work can be opened. 2d, the pressure gauge soon determines where the difficulty exists: or it can, if it require cleaning, be shut off, and the gas conducted through the bye-pass, when all its parts can be removed easily, as they are all adjustable.

It would seem upon a close investigation to furnish all conditions for the improvement of the manufacture of gas made from bituminous coal. Yours truly,

WILLIAM H. ST JOHN.

Gas Meters.

NEW YORK, July 7, 1871

Messrs. Editors: I noticed in your valuable Journal some weeks since, a brief history of the gas meter, which to my mind was nothing more or less than what most people conversant with gas meters are well acquainted with. I was subsequently amused by two of your correspondents taking mighty umbrage at the freedom of your remarks, appearing as if the *cap fit*, etc. With your permission we will carry the discussion a step further, in order that the gas meter may get the benefit, if it is worthy, or the disgrace if it deserves it.

It is well known that the meter stands between two opposites, buyer and seller; what it gives to one it takes from another, that being so, like Cæsar's wife, it should be above suspicion. Is it so? It is not. That is just where all the trouble comes in, and if a meter was as true as a chronometer, it would naturally be looked upon by the buyer of gas with suspicion.

In the first place a gas company having a monopoly, and using that monopoly exclusively for its own benefit, will necessarily be regarded as having no soul to be saved, consequently they must expect that the instrument they supply as a referee is of the same character as themselves. Some time ago I noticed an article referring to gas meters, where it was stated that the gas companies would not purchase meters that did not register 25 per cent. in their favor, which was copied in your Journal. This may be all pure invention; but the great and all important question is: Can the meter at all times be relied on as a faithful and unerring arbitrator? I unhe itatingly say it cannot, and, as a rule, the consumer always suffers for the shortcomings of the meter. By way of illustration we will take a new dry meter, test it in the usual way, let it run for six months, let it stand still for two months, and the great probability is that it will be from five to ten per cent fast. This is due entirely to the diaphragms contracting. Another source of error: Suppose the tangent that governs the revolutions gets misplaced, the meter is all at sea. I will now give you a case which occurred in my own business

In the year 1867 I had occasion to make a series of experiments in London, for a large printing establishment, whose consumption was very regular, and rated, with the use of my patent governor and pressure indicator, 15,000 feet per week, never varying 300 feet. After being in this state for three months, the consumption went up to 18,000, which was detected the first week. The meter was tested, and proved 20 p. c. fast; another meter brought us to the 15,000. This meter was tested and stamped under the Meter Act of 1860, and up to the time mentioned had registered correctly.

I know of several similar cases. The only way to make the public believe in the gas meter is to give them the means of testing it independent of the gas companies or their agents, and let such testing be made by parties who are bound to act fairly between the two.

The whole question is this; if you purchase a joint of meat and suspect that you are cheated out of your weight, it is easy to go to another scale and test your butcher's honesty where there is no monopoly of your custom, but where are you to go if you suspect your gas meter, which, without implying dishonest motives of the gas companies, is, of necessity, liable like all other machines, to get out of order. In conclusion I would say that until there is a Legislative Enactment, similar to the English Meter Act of 1859, the public will never be satisfied that they are not cheated, however true a meter may be. Respectfully Yours,

JOHN KEELING.

On Cleaning Retorts,

TIFFIN, OHIO, July 4, 1871.

Messrs. Editors: Many small works have no means of cleaning out retorts, but by opening the lids and stoppers of bridge pipes, and to them this letter is directed.

I have been in the habit of inserting a pipe 2 to 4 inches from the mouth, directed at the largest piece of carbon in the retort, but have found the destruction of pipes quite an item; and when the lid only is opened, all the cracks in and near the front get thoroughly cleaned out before the carbon at the rear is removed; some of them are usually quite large, and cause considerable loss of gas before they close again.

My son tried an experiment which is working well, and I submit it for the good of the craft. Instead of drawing the charge of coke, open the lid, and see that there is space for air to pass freely over the coke; if so, leave it in that state, and with the aid of the burning coke, the carbon will consume nearly three times as fast.

I would like some of those who try it to report the result to you. Yours etc,,

MACHINIST.

The American Coal Gas-Light Improvement Co.

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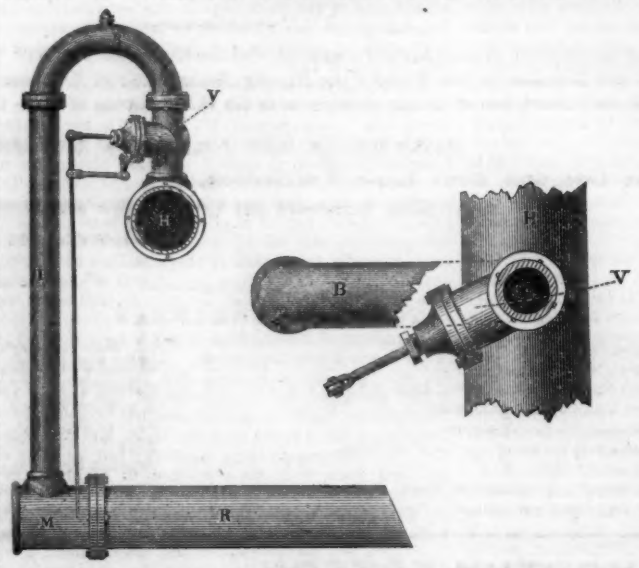

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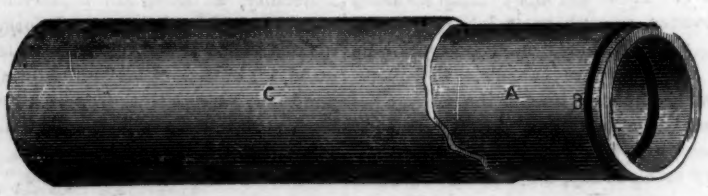

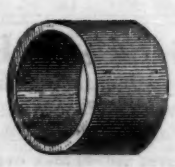

FIG. 2.

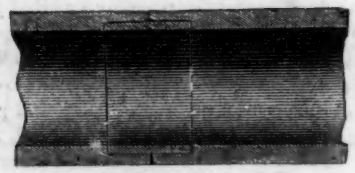

FIG. 3.

A—Cylinder of Wood. B—Band of Iron. C—Coating of Hydraulic or Asphaltum Cement.

FIG. 2.—Thimble for Connection. FIG. 3—Horizontal Section and Connection.

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MONDAY, JULY 17, 1871.

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A GREASE TREE.—They have in China what is known as the grease tree. Large forests of it grow there, and the oleaginous product has become an article of traffic. The grease forms an excellent tallow, burning with a clear, brilliant and—what is infinitely more to the purpose—white light, and at the same time emitting not a trace of any unpleasant odor, or of the ordinary disagreeable accompaniments of combustion—smoke.

General Editorials.

THE BRITISH ASSOCIATION OF GAS MANAGERS.

It is in no apologetic vein or mood, that we point to the very large share of space we devote in this issue to the Inaugural Address of the Presiding Officer of this transatlantic Society. On the contrary, the points of interest it covers are so abundant that it would be difficult to make a better (though somewhat cursory) digest of recent progress in gas matters, upon the whole. We propose here, however, to throw out a few additional remarks on some of the points in Mr. White's address.

As to the utilization of the tar for pavements, this is no new thing with us. In New Haven particularly, any one would be struck with the smoothness, dryness in wet weather, and general perfection of the sidewalks, particularly those crossing the beautiful common, which are prepared in this way. The using of the tar by conversion of itself into gas, which Mr. White regards with so much favor and hope, is an object which, as our readers are aware, has received the late attention of American inventors. I trust we shall soon hear more about the progress of the experiments with the McCracken invention, employing superheated steam, of which we held good hopes. By the way, we observe that our account of this has been noticed in the German *Journal fur Gasbeleuchtung*. The subject received an editorial scoff from the London *Jour. of Gas-Lighting*, but it is clear that eminent British experts do not *all* look on the thing in this unfavorable light. Let us have it followed up.

Mr. White's remarks about the enforcement by law of richer gas, though having applicability of course to Great Britain, doubtless must be taken here *cum grano*. There are many cheap *enriching* agents in America, as we have of late repeatedly pointed out, which render it unnecessary for us to resort to the expensive cannels. Petroleum and naphtha are of course among these.

There is much that is suggestive in his remarks about burners, but this is a subject on which there is very much to say, and which we shall treat *in extenso* on another occasion. I cannot help asking, however, whether Mr. White, who is quite jocular in several other passages, did not intend to be slightly "sarkastikul" where he says the public use burners generally that depreciate the gas 50 per cent., and "that this is a very important matter, and deserves the serious attention of all gas-managers." Most people would "rather think it did," while others might think it did'nt. Such burners tell pretty largely for the producer.

Mr. White's remarks about the photometric investigations of Messrs. Farmer, Pole, Charles Hunt, and Prof. Silliman, we shall also discuss again. He does not seem to be aware of the fact that the formula he attributed to Pole was published many months before by Mr. Stimpson, (not even mentioning the name of the latter gentleman) in this country, who showed moreover that its principle had been long ago discovered by Bunsen.

Mr. White's speculation that man may at some time henceforward "illuminate the earth with pure hydrogen," compressed, according to Frankland's discovery, is curious; but we may ask, why compressed; why not *enrich* it with hydrocarbons of high equivalents? Another consideration, somewhat fundamental, has escaped Mr. W.; this is, when our fuel shall be gone, where are we to get the hydrogen? Fuel seems indispensable to any conceivable method of isolating hydrogen in great quantitiy. It is true that if we could use *solar* heat as a substitute, we might prepare hydrogen. This concerns a time, however, still rather far in the future.

With regard to the patent of Eveleigh of 1869, Mr. White's specification is scarce clear enough for us. From other notices, we had gathered the idea that Eveleigh's principle was similar to that of the patents of Dr. Gale, with petroleum, etc., first producing oily vapors from coal at rather low heats and then gasefying at higher heats in secondary retorts. From his other remarks it is clear that we are far ahead in this country in knowledge of the theory and practice of treating oily matters to make *permanent incondensable* gases (For example, see our editorials of April 3d and May 16th in this Journal, and the report of Mr. Edgerton, published lately by us). Mr. White appears to think that such decomposition of these vapors into gases must require high temperatures and great pressures, whereas *we* have for some time been aware that the proper temperatures are quite *low*, even as low as dull red.

While on this subject, let us ask again to know, why it is that there is such general apathy in responding to our efforts to awaken the attention of the American Gas World to the organization of an Association similar to that whose rich results are now before us in Great Britain? The only communication we recollect to have received lately, manifesting any interest in this project is in the concluding sentence of the letter of our Milwaukee correspondent "Out West," in issue of June 2d. Is there no *esprit du corps* in our American fraternity?

There is one reflection dictated to us by the consideration of Mr. White's address, and of the general character of the business of the British Association, which we must dilate upon slightly. Is it not distinctly perceptible that the British fraternity, at least, are rapidly leaving behind them the old landmarks, and forgetting the traditions which have been so prevalent among the guild, on both continents? Now-a-days it would almost appear as if they were rapidly becoming like the Athenians of St. Paul's time, who "spent their whole time in nothing else, but either to hear or to tell of something new." We are here reminded of strictures that we are told of, upon the course of this Journal in giving circulation to new things.

We suppose it must be admitted as a maxim that progress cannot be made in any art without "treading on the toes" of others, who prefer to sit still. This being admitted to be inevitable, it follows that a Journal which adopts such plans and policy as ours, in giving a hearing at least, and, as far as possible, an examination, to everything, however novel and even at variance with ordinary practice, but which may yet contain *possible* merit will be liable to run foul of existing interests and prejudices, and hence may make enemies; and as enemies are sometimes more active than friends, we may at times thus sustain transient injury. However, we attach to our course the belief that it is the true and only *independent* one for a technical Journal like this, and that in the long run this will be recognized even by those who now disapprove. Even these will recognize that it is by this course alone we can maintain the advanced position which a scientific Journal should occupy. It is thus only that we can expect to *lead* and not to *follow*.

Let us, in conclusion, again urge that in one respect we should all follow the praiseworthy lead of our brethern over the water, whose example has now been for not less than eight years before us; and at once establish a movement for

for an *American Association* with similar objects and pursuits. May we not hope at last for some response to our proposition. We will do all that in us lies to keep such a ball rolling if fairly started.

METERS.

As Mr. Keeling, in his usual able way, in our "Correspondence" columns to-day, has taken up the cudgels in this little quarrel, the editor thinks it due to himself to say here, that the editorial matter which gave rise to this slight "unpleasantness," having given offence (through some misapprehension, as we think) to some of our friends, was not from his own pen, and at the time when it appeared, did not imply any responsibility on his part.

The meter question is one which always excites much interest in gas circles, whenever it comes up, and we are glad that it has been raised in our columns, hoping that it may not be allowed to drop again. There is nothing we more desire than the intelligent discussion of such questions, and this is one of especial interest as between producers and consumers, two classes whose interests constitute *our charge alike and mutually*. This we emphasize, in order to do what we may to repel alike the insinuations that emanate from some who assert that we are the "organ of the gas-companies" (See, for instance, the *York Herald's* comments in the case of the imbroglio between the Metropolitan Gas Company and the Board of Health, some two years since) and those from others, that we fight *against* the interests of these corporations. We ask: Is not the utter inconsistency of these two accusations a complete refutation of both, and presumptive evidence of the earnestness of our endeavors to be independent of trammels or bias on either side, and to pursue an even and medium course of justice to all?

It will be observed that Mr. President White, of the British Association of Gas-Managers, in his Inaugural Address, republished by us in this issue, has devoted some words to the meter controversy, promising us a paper, which was doubtless read, by Mr. F. W. Hartley, on the subject, the report of which has not yet reached us, but will be awaited with interest, and will probably furnish us a text for some further discourse. Mr. White makes the remarkable statement that *invariably*, in disputes between the Birmingham Gas Company and consumers, about meters, the meter have been found in the right. This we must believe to indicate a state of things in that English city, at least, with regard to reliability and perfection of workmanship, testing and inspection, which is in advance of what we enjoy in most of our American communities.

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THE AMERICAN

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Respectfully Yours,
H. A. ALLYN,
Superintendent Brookline Gas-Light Co.

EAST BOSTON, June 15, 1871.

Gentlemen: We have used your Screens some five years They give perfect satisfaction.

I consider them *by far the best Screen* for Dry Lime Purifiers I have seen.

Yours truly,
A. M. NORTON,
Supt. East Boston Gas-Light Co.

CHELSEA, May 1, 1871.

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Yours truly,
JOHN ANDREW, Supt.

JAMAICA PLAINS, MASS., June 21, 1871.

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JAMES F. ROGERS,
Supt. Jamaica Plains Gas-Light Co.

Also see letter from Providence, R. I., in another column.

It will be for the interest of all Gas-Light Companies needing new Trays another season, to give their orders early, to be delivered where wanted, as we were unable to fill orders promptly to Companies ordering late last fall.

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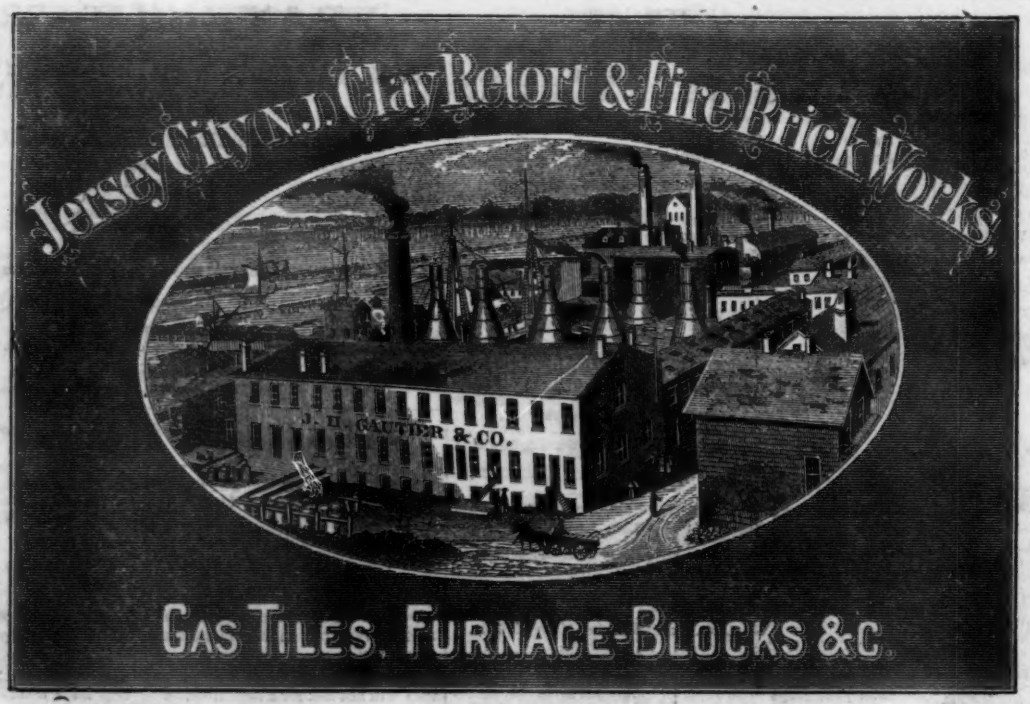

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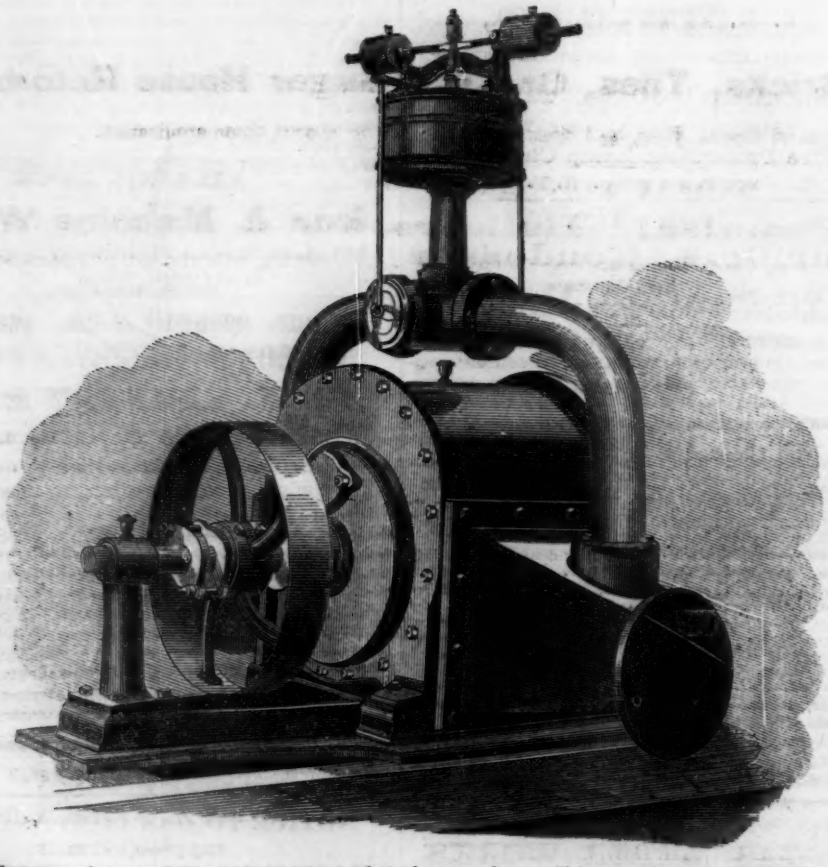

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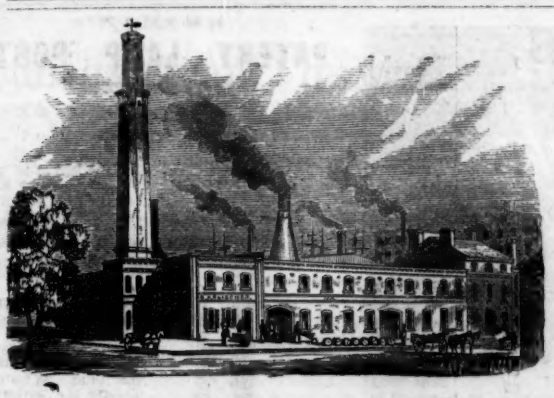

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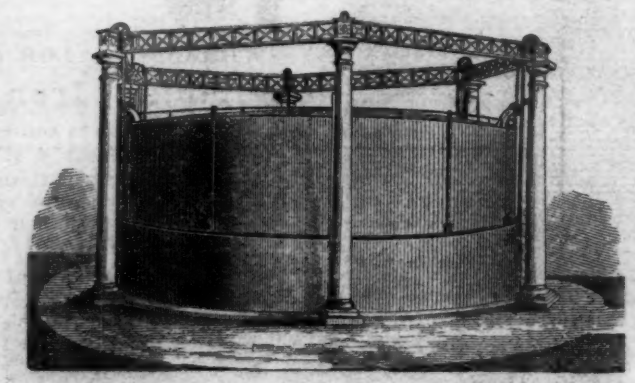

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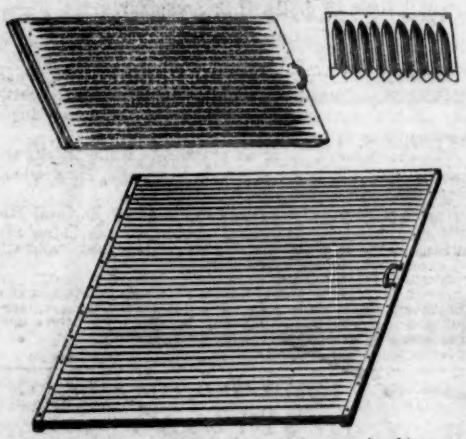

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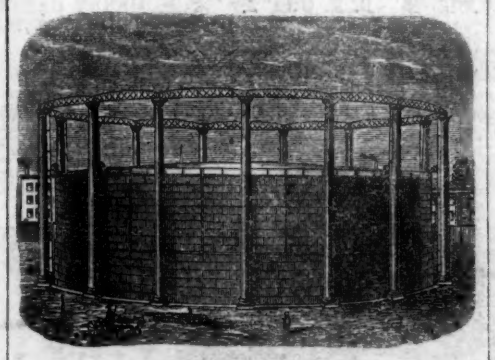

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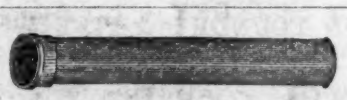

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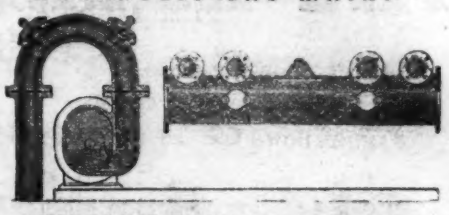

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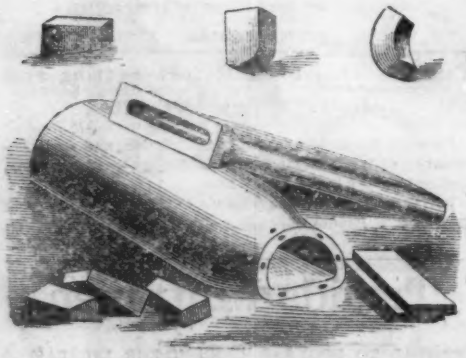

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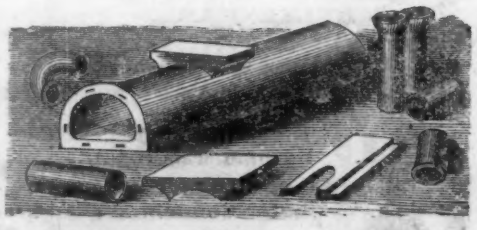

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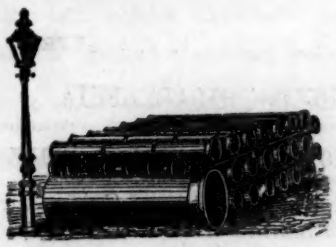

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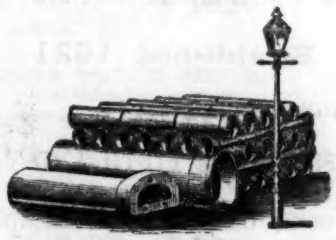

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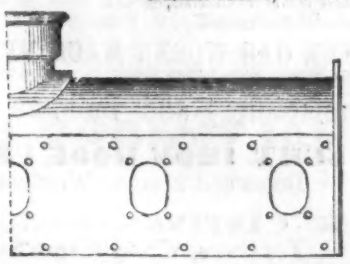

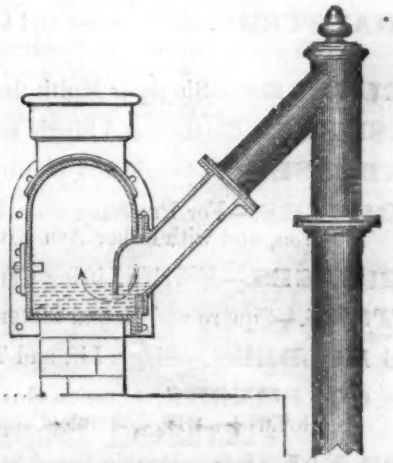

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